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Request for Continued Examination dated October 3, 2007
Reply to Final Office Action mailed April 3, 2007

REMARKS/ARGUMENTS

Claims 1-12 and 16-20 are pending in the present application. Claims 1, 2, 5, 7-12, 16, 18 and 19 are amended, and new claims 21-24 are added.

Claim Rejections – 35 U.S.C. § 102

Claims 1-2, 4-6, 16 and 19 are rejected under 35 U.S.C. § 102(b) as being anticipated by "A visual programming interface for an image processing environment" by Koelma and Smeulders. The Applicant respectfully traverses this rejection.

The present invention is a system and method for dynamically configuring image processing chains in digital medical imaging equipment. Processed images are generated after applying a sequence of transformations or image processing elements on raw images. The present invention provides a representation of an image processing chain with image processing elements, such that it can be changed dynamically, and mapping a clinical protocol to the image processing chain dynamically. The invention uses an interpreted language to represent image processing chains. The interpreted language may be a scripted language such as TCL, Perl, Python, etc.

Representing an image processing chain with image processing elements includes: 1) specifying an image processing chain; 2) applying image processing elements in series or in parallel to one or more raw images; 3) building larger image processing chains by combining smaller image processing chains in series or in parallel; 4) setting input images for each image processing element; 5) setting input parameters for each image processing element; 6)

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saving output images of different imaging processing elements; and 7) conditionally applying image processing elements.

The image processing chains are represented as scripts and saved to script files. The script files of image processing chains may be edited with a text editor. The script files may be read at runtime by an image processing module (runtime editable representation file). The image processing elements are represented as human-readable strings.

Mapping a clinical protocol to an image processing chain includes: 1) creating or editing an image processing chain using an image processing chain editor; 2) saving the imaging processing chain; 3) obtaining a clinical protocol from a clinical protocol database; and 4) associating the clinical protocol with the image processing chain using an image processing configuration tool.

The Koelma reference discloses a visual programming interface for an image processing environment. The Koelma reference includes a library of image processing functions. The Koelma reference discloses that a hierarchiacal structure in a data flow graph can be created by combining several functions into a single visual function with its own user defined icon. The visual programs of the Koelma reference are actually the hierarchical data flow graphs in a visual format.

The present invention has nothing to do with visual programming or providing a visual programming interface for an image processing environment. Visual programming is a programming language that utilizes visual representations such as graphics, drawings,

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animation or icons to represent programming functions. A visual programming language is a programming language that allows programming with visual expressions and allows users to specify programs by manipulating program elements graphically rather than by specifying them textually.

To anticipate a claim, the reference must teach each and every element of the claim. See MPEP § 2131. A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. Any missing elements may not be supplied by the knowledge of one skilled in the art or the disclosure of another reference.

Regarding claim 1, it is respectfully asserted that the Examiner has not established that the relied upon reference teach every element of claim 1.

Claim 1 includes the element of "providing a plurality of image processing elements as self-contained modules which can be executed individually in a plurality of different sequences." The Examiner asserts that this element is disclosed in the Kolema reference on page 8, by the following sentence: "The library handler (figure 2) gives a hierarchical overview of the image processing functions in the library (or libraries) known to the interface." Applicant disagrees with this assertion. Nothing is disclosed in the Kolema reference regarding executing image processing elements in a plurality of different sequences. Applicant contends that this element is not disclosed in the Kolema reference.

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Claim 1 further includes the element of "providing an image processing chain in a script file capable of execution by a script interpreter in a computer arranged to receive raw image data." The Examiner asserts that this element is disclosed in the Kolema reference on page 8, by the following sentence: "The worksheets (figure 3) are used to construct hierarchical data flow graphs from the functions in a library." Applicant disagrees with this assertion. Nothing is disclosed in the Kolema reference regarding providing an image processing chain in a script file capable of execution by a script interpreter in a computer arranged to receive raw image data. There is no mention of saving an image processing chain in a script file that is executed by a script interpreter. The cited sentence merely describes constructing hierarchical data flow graphs from functions in a library. It has nothing to do with script files or execution of script files by a script interpreter. In addition, the Kolema reference discloses nothing about receiving or processing raw image data. Applicant contends that this element is not disclosed in the Kolema reference.

Claim 1 further includes the element of "wherein the image processing chain determines a selected sequence of execution of the image processing elements." The Examiner asserts that this element is disclosed in the Kolema reference on page 8, by the following sentence: "The constructed data flow graph is executed with the aid of a C-interpreter." Applicant disagrees with this assertion. Nothing is disclosed in the Kolema reference regarding the image processing chain determining the sequence of execution of the image processing elements. The cited sentence merely describes executing a dataflow graph with a C-interpreter. It has nothing to do with the image processing chain determining the

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sequence of execution of the image processing elements. Applicant contends that this element is not disclosed in the Kolema reference.

Claim 1 further includes the element of "relating the image processing chain to a clinical protocol, which is subsequently executed by the computer while running a compiled image processing computer program to process raw image data." The Examiner asserts that this element is disclosed in the Kolema reference on page 9, by the following sentence: "Visual programs can be stored and retrieved as visual programs or they can be stored as C-programs." Applicant disagrees with this assertion. Nothing is disclosed in the Kolema reference regarding relating the image processing chain to a clinical protocol. A clinical protocol is a medical procedure or process used for diagnosis of a medical condition or disease. The cited sentence merely describes storing and retrieving visual programs, and storing visual programs as C-programs, it has nothing at all to do with relating an image processing chain to a clinical protocol. Applicant contends that this element is not disclosed in the Kolema reference.

Claims 2 and 4-6 are dependent claims, dependent upon independent claim 1, and thus should be allowable for the above reasons as well as for the additional elements they contain.

Regarding claim 16, it is respectfully asserted that the Examiner has not established that the relied upon reference teach every element of claim 16.

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Claim 16 includes the element of "providing a plurality of image processing elements as self-contained modules which can be executed individually in a plurality of different sequences." The Examiner asserts that this element is disclosed in the Kolema reference on page 8, by the following sentence: "The library handler (figure 2) gives a hierarchical overview of the image processing functions in the library (or libraries) known to the interface." Applicant disagrees with this assertion. Nothing is disclosed in the Kolema reference regarding executing image processing elements in a plurality of different sequences. Applicant contends that this element is not disclosed in the Kolema reference.

Claim 16 further includes the element of "providing an image processing chain in a script file capable of execution by a script interpreter in a computer arranged to receive raw image data." The Examiner asserts that this element is disclosed in the Kolema reference on page 8, by the following sentence: "The worksheets (figure 3) are used to construct hierarchical data flow graphs from the functions in a library." Applicant disagrees with this assertion. Nothing is disclosed in the Kolema reference regarding providing an image processing chain in a script file capable of execution by a script interpreter in a computer arranged to receive raw image data. There is no mention of saving an image processing chain in a script file that is executed by a script interpreter. The cited sentence merely describes constructing hierarchical data flow graphs from functions in a library. It has nothing to do with script files or execution of script files by a script interpreter. In addition, the Kolema reference discloses nothing about receiving or processing raw image data. Applicant contends that this element is not disclosed in the Kolema reference.

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Claim 16 further includes the element of "adding a new image processing element." The Examiner asserts that this element is disclosed in the Kolema reference on page 5, by the following sentence: "The addition of new image processing function should become almost trivial." Applicant disagrees with this assertion. Nothing is disclosed in the Kolema reference regarding adding a new image processing element. Applicant contends that this element is not disclosed in the Kolema reference.

Claim 16 further includes the element of "configuring the image processing chain to determine the sequence of execution of the image processing elements including the new image processing element." The Examiner asserts that this element is disclosed in the Kolema reference on page 13, by the following sentence: "The program can be re-executed immediately upon changes made to it." Applicant disagrees with this assertion. Nothing is disclosed in the Kolema reference regarding the image processing chain determining the sequence of execution of the image processing elements. The cited sentence merely describes re-executing a program immediately after making changes to it. It has nothing to do with the image processing chain determining the sequence of execution of the image processing elements. Applicant contends that this element is not disclosed in the Kolema reference.

Claim 16 further includes the element of "relating the image processing chain to a clinical protocol, which is subsequently executed by the computer while running a compiled image processing computer program to process raw image data." The Examiner asserts that this element is disclosed in the Kolema reference on page 9, by the following sentence:

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"Visual programs can be stored and retrieved as visual programs or they can be stored as C-programs." Applicant disagrees with this assertion. Nothing is disclosed in the Kolema reference regarding relating the image processing chain to a clinical protocol. A clinical protocol is a medical procedure or process used for diagnosis of a medical condition or disease. The cited sentence merely describes storing and retrieving visual programs, and storing visual programs as C-programs, it has nothing at all to do with relating an image processing chain to a clinical protocol. Applicant contends that this element is not disclosed in the Kolema reference.

Claim 19 is a dependent claim, dependent upon independent claim 16, and thus should be allowable for the above reasons as well as for the additional elements it contains.

The Applicant believes that claims 1-2, 4-6, 16 and 19 contain patentable subject matter and are in condition for allowance. Withdrawal of the rejection under 35 U.S.C. § 102(b) and allowance of claims 1-2, 4-6, 16 and 19 are respectfully requested.

Claim Rejections – 35 U.S.C. § 103

Claims 3 and 20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over "A visual programming interface for an image processing environment" by Koelma and Smeulders in view of U.S. Patent No. 6,078,967 to Fulghum. The Applicant respectfully traverses this rejection.

Claim 3 is a dependent claim, dependent upon independent claim 1, and thus should be allowable for the above reasons as well as for the additional elements it contains.

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Claim 20 is a dependent claim, dependent upon independent claim 16, and thus should be allowable for the above reasons as well as for the additional elements it contains.

Claims 7, 17 and 18 are rejected under 35 U.S.C. § 103(a) as being unpatentable over "A visual programming interface for an image processing environment" by Koelma and Smeulders. The Applicant respectfully traverses this rejection.

Claim 7 is a dependent claim, dependent upon independent claim 1, and thus should be allowable for the above reasons as well as for the additional elements it contains.

Claims 17 and 18 are dependent claims, dependent upon independent claim 16, and thus should be allowable for the above reasons as well as for the additional elements they contain.

Claims 8, 9, 11 and 12 are rejected under 35 U.S.C. § 103(a) as being unpatentable over "A visual programming interface for an image processing environment" by Koelma and Smeulders in view of Applicant admitted prior art. The Applicant respectfully traverses this rejection.

Claims 8, 9, 11 and 12 are dependent claims, dependent upon independent claim 1, and thus should be allowable for the above reasons as well as for the additional elements they contain. Claim 8 is amended to correct certain minor informalities in the claim.

Claim 10 is rejected under 35 U.S.C. § 103(a) as being unpatentable over "A visual programming interface for an image processing environment" by Koelma and Smeulders in

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view of Applicant admitted prior art, and further in view of U.S. Patent No. 5,005,578 to Greer et al. The Applicant respectfully traverses this rejection.

Claim 10 is a dependent claim, dependent upon independent claim 1, and thus should be allowable for the above reasons as well as for the additional elements it contains. Claim 10 is amended to correct certain informalities in the claim.

The Applicant believes that claims 3, 7-12, 17, 18 and 20 contain patentable subject matter and are in condition for allowance. Withdrawal of the rejection under 35 U.S.C. § 103(a) and allowance of claims 3, 7-12, 17, 18 and 20 are respectfully requested.

New Claims

Applicant believes that new claims 21-24 contain patentable subject matter and are in condition for allowance. Allowance of new claims 21-24 is respectfully requested.

Conclusion

In view of the amendments and remarks/arguments presented above, the Applicant believes that the application is now in condition for allowance, and respectfully requests reconsideration of the application, withdrawal of the rejections, and allowance of the claims. The Applicant respectfully requests that the Examiner telephone the undersigned in the event a telephone conference would be helpful in advancing prosecution of the application towards allowance.

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The Commissioner is hereby authorized to charge any additional fees, which may be required in this application, or credit any overpayments, to Deposit Account No. 070845. If any extensions of time are needed for timely acceptance of papers submitted herewith, the Applicant hereby petitions for such extensions under 37 C.F.R. § 1.136 and authorizes payment of any such extension fees to Deposit Account No. 070845.

Respectfully submitted,

Dated: 10/03/2007

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